**2** For each of the following tables determine whether the paired values $(x, y)$ would, if graphed, give points that lie in a straight line. For those that do determine the equation of the straight line. (You should be able to do this question from the tables and should not need to plot the points.)

**a**

| $x$ | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| $y$ | 7 | 9 | 11 | 13 | 15 | 17 |

**b**

| $x$ | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| $y$ | –2 | 3 | 8 | 13 | 18 | 23 |

**c**

| $x$ | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| $y$ | 0 | 1 | 3 | 6 | 10 | 15 |

**d**

| $x$ | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| $y$ | –3 | –2 | –1 | 0 | 1 | 2 |

**e**

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| $y$ | 10 | 8 | 6 | 4 | 2 | 0 |

**f**

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| $y$ | 5 | 5 | 5 | 5 | 5 | 5 |

**g**

| $x$ | 3 | 4 | 1 | 6 | 2 | 5 |
|---|---|---|---|---|---|---|
| $y$ | 9 | 4 | 16 | –9 | 13 | –2 |

**h**

| $x$ | 4 | 2 | 1 | 6 | 3 | 5 |
|---|---|---|---|---|---|---|
| $y$ | 7 | –3 | –8 | 17 | 2 | 12 |

**Answer:**

**2** **a** Points lie in a straight line.
Equation of line is $y = 2x + 5$.

**b** Points lie in a straight line.
Equation of line is $y = 5x - 7$.

**c** Points do not lie in a straight line.

**d** Points lie in a straight line.
Equation of line is $y = x - 4$.

**e** Points lie in a straight line.
Equation of line is $y = -2x + 10$.

**f** Points lie in a straight line.
Equation of line is $y = 5$.

**g** Points do not lie in a straight line.

**h** Points lie in a straight line.
Equation of line is $y = 5x - 13$.

## Questions

For each of the tables shown in questions 1 to 12, by considering difference patterns, determine whether the relationship between $x$ and $y$ is linear, quadratic or neither of these. For those relationships that are either linear or quadratic determine the rule.

**1**

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| $y$ | 5 | 12 | 21 | 32 | 45 | 60 |

**2**

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| $y$ | 0 | 1 | 8 | 27 | 64 | 125 |

**3**

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| $y$ | 3 | 5 | 9 | 15 | 23 | 33 |

**4**

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| $y$ | 1 | 6 | 11 | 16 | 21 | 26 |

**5**

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| $y$ | 2 | 3 | 6 | 11 | 18 | 27 |

**6**

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| $y$ | $\pi$ | $2\pi$ | $3\pi$ | $4\pi$ | $5\pi$ | $6\pi$ |

**7**

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| $y$ | 3 | 6 | 12 | 24 | 48 | 96 |

**8**

| $x$ | 4 | 3 | 0 | 5 | 1 | 2 |
|---|---|---|---|---|---|---|
| $y$ | 40 | 28 | 4 | 54 | 10 | 18 |

**9**

| $x$ | 1 | 4 | 2 | 0 | 5 | 3 |
|---|---|---|---|---|---|---|
| $y$ | 11 | 35 | 19 | 3 | 43 | 27 |

**10**

| $x$ | 1 | 3 | 2 | 5 | 4 | 0 |
|---|---|---|---|---|---|---|
| $y$ | 5 | 21 | 11 | 53 | 35 | 3 |

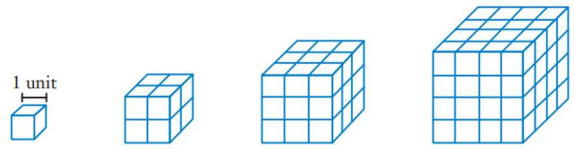
**11**

| $x$ | –1 | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| $y$ | 28 | 13 | 4 | 1 | 4 | 13 | 28 |

**12**

| $x$ | –2 | 0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|---|
| $y$ | –20 | –4 | 4 | 4 | –4 | –20 |

**13**



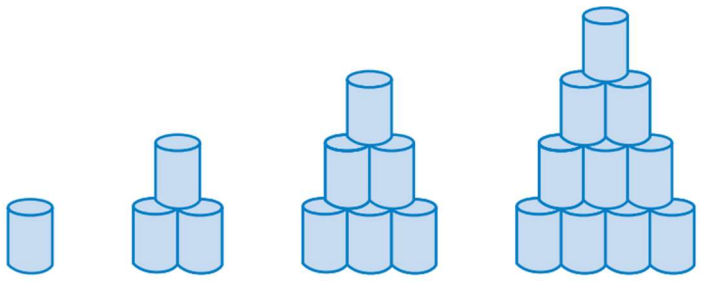

**a** Copy and complete the table shown below for the pattern shown above.

| Length of side of cube ($L$ units) | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Surface area of cube ($n$ units$^2$) | 6 | 24 | | | | |

**b** Use difference patterns to determine whether the relationship between $L$ and $n$ is linear, quadratic or neither of these.

**c** If linear or quadratic, determine the rule.

**14**



**a** Copy and complete the table shown below for the pattern shown above.

| Number of rows of cans ($r$) | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Number of cans ($n$) | 1 | 3 | 6 | | | |

**b** Use difference patterns to determine whether the relationship between $r$ and $n$ is linear, quadratic or neither of these.

**c** If linear or quadratic, determine the rule.

**Answers**

**1** Quadratic. $y = x^2 + 6x + 5$
**2** Neither.
**3** Quadratic. $y = x^2 + x + 3$
**4** Linear. $y = 5x + 1$
**5** Quadratic. $y = x^2 + 2$
**6** Linear. $y = \pi x + \pi$
**7** Neither.
**8** Quadratic. $y = x^2 + 5x + 4$
**9** Linear. $y = 8x + 3$
**10** Quadratic. $y = 2x^2 + 3$
**11** Quadratic. $y = 3(x - 2)^2 + 1$
**12** Quadratic. $y = -(x - 3)^2 + 5$

**13** **a**

| **Length of side of cube ($L$ units)** | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **Surface area of cube ($n$ units$^2$)** | 6 | 24 | 54 | 96 | 150 | 216 |

**b** Quadratic **c** $n = 6L^2$

**14** **a**

| **Number of rows of cans ($r$)** | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **Number of cans ($n$)** | 1 | 3 | 6 | 10 | 15 | 21 |

**b** Quadratic **c** $n = 0.5r^2 + 0.5r$